

Software Product Description

PRODUCT NAME: RT-11, Version 5.1B
Single-User Operating System

SPD 12.01.24

DESCRIPTION

RT-11 is a single-user, realtime operating system designed to be operated on the PDP-11 series of processors. Small, fast and efficient, it has been used as the base for many applications in a variety of business, commercial and scientific environments. Capable of both realtime and data processing, RT-11 also offers a full range of system utilities to facilitate interactive program development.

The straightforward design of RT-11 contributes to its inherent ease-of-use and efficient utilization of system resources. The operating system itself requires minimal system overhead, optimizing the available user space for storing programs and data.

The RT-11 Operating system offers the following configurations:

SJ Monitor — Enables one job at a time to execute in memory. As distributed, SJ resides in approximately 6 KB of memory and requires minimal overhead. Should the user's requirements change, a properly written program that runs under the SJ monitor can be executed under the FB or XM monitor as a background program without modification.

FB Monitor — Operates a foreground job and a background job. The real time function is accomplished in the foreground, which generally has priority on system resources. Functions that do not have critical response time requirements, such as program development, are accomplished in the background, which operates whenever the foreground job cannot run. Within their priorities, both foreground and background are fully functional RT-11 programs with access to system capabilities. Although they operate independently, foreground and background can communicate through disk files and/or the message transmission facility.

Extended Memory (XM) Monitor — Is a version of the FB monitor for supporting systems with more than 64K bytes of memory. Programs can take advantage of this feature for storing data and instructions above the lowest 64K bytes of memory. A LINKER option allows FORTRAN IV and MACRO-11 programmers to load overlays in extended memory for fast access.

Features

Ease of Use — Designed for the single-user in an interactive environment, the English-language keyboard commands are easy to use and understand. The EXECUTE command, for example, allows transition from source to executing code with one command. Indirect command files allow command sequences to be stored and invoked repeatedly by the user.

Customer Installation — An Automatic Installation procedure is provided which installs RT-11 by conducting an interactive dialog at the console terminal, without the aid of a software specialist.

Contiguous File Structure — Contiguous file structure for random-access devices requires minimum file access overhead.

Configuration Independence — Provides device-independent I/O programming; for example, at run time the user can either send output directly to a printer or write it to a disk file for later printing.

Flexible Real Time I/O — Satisfies a wide variety of input/output requirements by providing the following three modes of I/O operation:

- Synchronous I/O, where user program processing is suspended until the completion of an I/O event.
- Asynchronous I/O, where an I/O event is started and user program processing continues until a user-defined point is reached. Processing is then suspended until the I/O event is completed.
- Event driven I/O, where an I/O event is started and user program processing continues until the I/O event completes. Processing is then interrupted to service the completed I/O event.

Low System Overhead — RT-11's modular structure enables some monitor components to be swapped in as needed. However, if the program's memory requirements allow it, the complete monitor stays resident in memory to improve system responsiveness.

Peripheral Handlers — The modularity of the I/O system allows users with unique devices to interface them easily, by writing a device handler and storing it as a file on the system device.

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When a new peripheral handler is added to an RT-11 system, properly coded programs can immediately use the device without requiring additional coding or reassembly.

Indirect Command Files — Sets of system commands can be stored in an indirect command file that can be executed through a single keyboard command. In addition, an indirect command file can be called automatically at system start-up time.

Multiterminal Support — RT-11 Optionally supports from one to sixteen terminals in addition to the console terminal. These terminals can be addressed by specially written programs (or by optional software) and can be interfaced by up to eight DL11s, two DZ11s, up to eight DLV11s, one or two DLV11-Js, or up to four

DZV11s (a total of 16 lines). A terminal on a local DL(V)-11 interface must be connected to the hardware console interface (vectors 60,64) at bootstrap time.

There can be only one "command console terminal" per system at any time. Originally, the command console is the terminal that is connected to the hardware console interface, but it can be reassigned to any other local terminal through a simple keyboard command.

RT-11 provides an optional feature which allows a remote terminal to be the system console in the FB and XM environment. The foreground job can communicate with a private console terminal, other than the command console always used by the background job. Multiterminal support is available with the RT-11 FB or XM monitor. The multiterminal support allows dial-up remote users to be connected via Bell 103-type modems. RT-11 does not support leased lines. System generation must be performed for RT-11 multiterminal support.

System Generation — RT-11 is shipped in pre-generated, ready-to-use form. Users who require special features, or a highly optimized system tailored for a particular application, must perform system generation.

Although technically possible, diskette system generation is not recommended due to the amount of media swapping and the time required.

Write protect for Disks — Users can employ the "disk-write-protect" feature via a SET command to the handlers for the following devices:

- DX: RX01 Diskette
- DY: RX02 Diskette
- PD: PDT 11/150

Flexible User Commands — RT-11 supports a variety of user commands, including Digital Command Language (DCL), Concise Command Language (CCL), and provides a User Command Linkage (UCL).

Concise Command Language (CCL) — allows the user to issue commands directly to utility programs on a single command line.

User Command Linkage (UCL) — allows the user to define and implement unique "commands."

The user is free to implement UCL.SAV in any number of variations, providing extensive flexibility in defining new or syntactically different commands for RT-11. An example of UCL.SAV is provided on the distribution kit which implements immediate command definition of the form NEWCMD ::= RUN PROG etc.

Indirect Control File Processor (IND) — Executes indirect control files. These files can be used to access files, execute keyboard monitor commands, define symbols, pass parameters, and perform logical tests. IND is compatible with the RSX-11 control file processor; with few or no changes, a control file written for either RT-11 or RSX-11 will execute under the other operating system.

System Jobs — The FB/XM monitors can optionally support up to six extra jobs, called system jobs. These system jobs are programs supplied by DIGITAL and run in parallel with user-written foreground and background jobs. System job support is included in the distributed XM monitor and is also available under the FB monitor through system generation. DIGITAL does not support user-written system jobs.

Five RT-11 utilities (SPOOL, VTCOM, KEX, ERROR LOGGER and QUEUE PACKAGE) can run as system jobs (in addition to the background and foreground jobs) if system job support is enabled through the system generation process. Each of these utilities can also run as standard foreground jobs.

The ERROR LOGGER keeps statistics on successful and unsuccessful transfers for random access devices. System generation must be performed for error logging support.

Spooling Packages — RT-11 offers the user a choice of two spooling packages.

Transparent Spooling Package (SPOOL) — Is a utility designed to provide simultaneous output to printers (or any other RT-11 serial device) concurrent with other system actions. SPOOL can be operated without requiring the user to directly command and control spooler actions; system operation remains consistent in both the spooled and nonspooled environments.

Queue Package (QUEUE) — Is a utility that sends files to any RT-11 device; it is particularly useful for queuing large files for subsequent printing while allowing other system actions to occur. QUEUE requires direct operator control to manipulate print actions.

KED — Uses the keypad keys on the keyboard to allow a user to position a visible cursor anywhere in a text file and to make changes and insertions easily.

KEX — Is a variant of KED optimized for the XM environment. Because it is a virtual job, multiple copies of KEX may be executed simultaneously under the XM monitor if it is generated with system job support. Both KED and KEX are available when using the XM Monitor.

Single-line Editor (SL) — This feature allows the user to edit the current keyboard command line, or CSI command string typed on a video terminal prior to terminating the line. The previous two commands or input lines can also be recalled for editing.

Virtual Terminal Communications Package (VTCOM/-TRANSF) — This utility allows the user to communicate with a host system while running RT-11, as if the stand-alone system was a local terminal. The user can use the resources available on the host system such as electronic mail and programming languages, and still be able to use RT-11 resources on the stand-alone system. VTCOM transfers ASCII files between the host and Stand-alone RT-11 system. Binary files can also be transferred through the VTCOM utility, if the TRANSF utility is installed on the host system.

Virtual Run Capability (VBGEXE) - This UNSUPPORTED utility executes properly coded non-virtual programs as virtual programs without modifications.

Logical Disk Subsetting (LD) — The logical disk subsetting facility (LD) lets the user define logical disks, which are subsets of physical disks. Operations can then be performed as though the logical disk were a physical disk. This feature provides for more directory entry space and enhances device and file operation performance.

SYSLIB — Provides access to system services directly from a FORTRAN program. Routines are provided to support direct file I/O, asynchronous FORTRAN subroutines, FORTRAN interrupt routines, and multiterminal support.

HELP — Allows a user to access information about keyboard commands. This information can be modified to meet the user's needs.

Virtual Memory (VM) Handler — RT-11 supports memory above 56KB (up to 4 MB) as if it were an RT-11 file structured random access device. The VM Handler may be used as the system/data device under the FB monitor. Under the XM monitor, it may be a data device only.

RT-11 System Programs

EDIT — Text editor to create and modify ASCII text files. Both character and line-oriented commands are included with provisions for command interaction, editing macros, and file manipulation.

MACRO-11 — Provides macro assembly language programming under RT-11. It has the facilities for using macro libraries, Cross Reference (CREF) listing, conditional assembly directives, and pseudo operators. MACRO-11 offers the convenience of global symbols for linking object modules and extensive error diagnostics.

Linker (LINK) — Converts relocatable object modules produced by the assembler or optional compilers into run-time format. Services performed by LINK include converting relative addresses to absolute addresses, resolving external references among object modules,

and initializing all parameters required by the monitor to run a program.

Overlays do not require any special instructions or function calls. The user designates an overlay structure at linker command time and the linker automatically produces a runnable memory image with the desired overlays. Ease of use of the overlay structure is of primary importance, but the power of the overlay system has not been compromised. The system allows multiple overlays subject only to memory size. Under the XM monitor, the linker allows overlays to be loaded into extended memory at run-time and executed directly from that memory.

Peripheral Interchange Program (PIP) — Allows transfer of files (ASCII or binary) between any RT-11 supported peripherals.

Resource (RESORC) — Examines the currently running RT-11 system and displays information about the status of the monitor and the system configuration.

Librarian (LIBR) — Creates and maintains libraries of commonly used object module subroutines and assembly language macro definitions. The linker uses object libraries (as specified by the user) to resolve undefined external symbols.

Directory (DIR) — Used to list the file directory for file-structured devices. DIR allows directory listing sorted by file name, file type, date, size or position.

Device Utility Program (DUP) — Performs general utility functions in support of mass storage devices. Among DUP's functions are initializing devices, scanning for bad blocks, and consolidating free space on a disk.

Backup Utility Program (BUP) — The backup utility program (BUP) provides a quick way to store a large volume or file on a set of several smaller volumes if a file is larger than one of the smaller volumes. BUP also allows you to initialize backup volumes, obtain directory information about a set of backup volumes, and RESTORE a volume or file from a set of backup volumes to its original form as a file on a volume or as an entire volume. Unlike PIP, BUP does not produce RT-11 structured files when backing up, and therefore, the information on the backup volumes cannot be accessed as such by other RT-11 utilities. The RESTORE facility of BUP recreates the RT-11 file structure.

This very fast, multi-volume backup/restore facility supports the streaming capabilities of DIGITAL'S nine track 1600 BPI tape drives, the TSV05 and the TU80.

SET UP Program — Allows the user to set operation modes for the VT1xx and VT2xx terminal series; and the LA50 and LA100 Serial Printers.

The SETUP program uses simple, English language commands. SETUP is especially useful for setting video characteristics by including SETUP commands in startup indirect command files or IND control files.

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DUMP — Allows the contents of a file to be printed in various formats.

SRCCOM — Is an ASCII file comparison program that helps locate changes made in source files.

BINCOM — Is a binary file comparison program that helps locate changes made in binary files. BINCOM can also compare whole volumes.

FILEX — Allows transfer of RT-11 files to and from some other operating system environments.

FORMAT — Allows the user to format RK05, RK06, and RK07 disks and RX01/RX02 diskettes. FORMAT also provides disk verification by writing patterns and reading them on each block of the volume.

Debugging and Patching — RT-11 provides the following utilities to aid users in finding, diagnosing and correcting programming errors.

- **ODT** — On-Line Debugging Technique utility aids in interactive programming debugging.
- **VDT** — Virtual Debugging Technique utility aids in the interactive debugging of extended memory programs and multiterminal applications.
- **SIPP** — Save Image Patch Program can be used to patch files that were linked under RT-11 (Version 4.0 or later).
- **PAT** — Object module patch program performs minor modifications to files in object format.
- **SLP** — Source file patch program provides an easy way to make changes to source files.

Optional RT² Run-Time System

RT² is a license to operate a subset of RT-11 software. The current version of RT-11 system is required for developing application software which operates on an RT² system. RT² software provides a single job (SJ), foreground/background (FB), or Extended Memory (XM) execute-only environment for applications developed on a TRADITIONAL PDP-11 RT-11 system. It is the user's responsibility to transport the RT² software and the user-developed software from the RT-11 system to the target RT² system.

RT² licenses the use of the following modules:

- RT11SY.SYS RT-11 SJ monitor
- RT11FB.SYS RT-11 FB monitor
- RT11XM.SYS RT-11 XM monitor
- DD(X).SYS TU58 handler
- DY(X).SYS RX02 handler
- DL(X).SYS RL01/RL02 handler
- RK(X).SYS RK05 handler
- DU(X).SYS UDA50 class handler (RX50, RD51, RA80)
- DX(X).SYS RX01 handler
- TT.SYS Console Terminal handler

- LP(X).SYS Line Printer handler
- LS(X).SYS Serial Line Printer handler
- DUP.SAV Device Utility Program
- KED.SAV Keypad Editor for VT1xx family
- KEX.SAV Keypad Editor for the XM Monitor
- PIP.SAV Peripheral Interchange Program
- DIR.SAV Directory Listing Program
- BUP.SYS Backup Utility Program
- VTCOM.SAV Virtual Terminal Program
- TRANSF.SAV Communications Program
- SETUP.SAV Device Control Program
- BASIC-11 requires a separate license to run on RT².

Applications developed under FORTRAN IV/RT-11 can be used under RT² along with the FORTRAN IV OTS. The FORTRAN IV Compiler may not be used on RT².

SOURCE CODE INFORMATION

Source code for monitors*, most handlers*, unsupported demonstration programs, utilities, and control files is available on all machine readable distribution media for this product, and on microfiche.

This source code is supplied in order to provide maximum flexibility in configuring the system.

This source code is provided on an "AS IS" basis without any warranty of any kind, either express or implied.

* Uncommented

Uncommented sources are sometimes included on the Binary Kits only as a way of providing a SYSGEN capability. Future distribution of uncommented sources is not implied by their current distribution.

MINIMUM HARDWARE REQUIRED

The typical RT-11 system includes the following:

PDP-11 or LSI processor with 32K bytes of memory
VT1xx series or LA1xx series console

One of the following mass storage configurations:

- RD51/RX50, RD52/RX50. Distribution kit resides on RX50 diskettes.
- Dual RL02 disks. Distribution kit resides on RL02 disk.
- Dual RX02 diskettes. Distribution kit resides on diskette.

Refer to Table 1 for the entire list of systems supported.

MEMORY: To provide a system monitor and basic system utilities, there needs to be at least 32K bytes of memory for SJ, at least 48K bytes of memory for FB, and more than 76K bytes for XM.

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Minimal monitor size is as follows:

| MONITOR | PDP-11/LSI |
|---------|------------|
| SJ | 5K Bytes |
| FB | 9K Bytes |
| XM | 22K Bytes |

Options selected through system generation may increase memory requirements.

- **CONSOLE TERMINAL:** LA12, LA34, LA38, LA100, LA120, VT100, VT101, VT102, VT125, VT131, VT105, VT2xx (7-bit mode only). RT-11 does not support the block mode transmission feature of the VT131.
- **CLOCK:** Line frequency clock for FB/XM operation
- **EIS, and KT11 Memory Management Unit for XM**
- **SYSTEM DEVICE:** Every RT-11 system must have a random-access mass storage device for the system device (see Table I for specific devices).
- **SYSTEM BACKUP DEVICE:** Every RT-11 system must have a system backup device other than the system device (see Table I).
- **SOFTWARE DISTRIBUTION DEVICE:** Either the system device or the system backup device must be a distribution medium.

9-track (800 BPI) magnetic tape (for system device that is either RA80, RK05, RK06, RK07, RL01, RL02, OR RP03), RK05, RL01, or RL02 disk cartridge, RX01 or RX02 diskette (8"), RX50 Diskette (5-1/4").

Table I
RT-11 Minimum Hardware Requirements

| System | Minimum Memory | System Device Medium | Backup Device Medium |
|--------------------|----------------|--------------------------------------|--------------------------------------|
| PDP-11 | 32K bytes | RA80 | Magnetic Tape |
| Unibus | | RK05 | RK05 |
| 11/04, 11/05 | | RK06* | RL01 |
| 11/10, 11/20 | | RK07* | RL02 |
| 11/24, 11/34 | | RL01 | RX01 |
| 11/35, 11/40 | | RL02 | RX02 |
| 11/44, 11/45 | | RX01 | |
| 11/50, 11/55 | | RX02 | |
| 11/60 | | | |
| PDT 11/150 | 32K bytes | RX01 | RX01 TU58 |
| PDP-11/03 (LSI-11) | 32K bytes | RK05 RL01 RL02 RX01 RX02 | RK05 RL01 RL02 RX01 RX02 |
| PDP-11/23 | 64K bytes | RL01 | RL01 |
| PDP-11/23-PLUS | | RL02 RX02** | RL02 RX02 TSV05 |

| System | Minimum Memory | System Device Medium | Backup Device Medium |
|--------------|----------------|----------------------|----------------------|
| MICRO/PDP-11 | 256K bytes | RD51 RD52 | RX50 |

*RT-11 is not distributed on RK06 or RK07 disk cartridges, except with CTS-300 (SPD 12.09.xx)

** The RX02 is a system device medium for the PDP-11/23 ONLY.

OPTIONAL HARDWARE

- Additional memory to a supported total of

| Monitor | Physical Memory |
|---------|------------------------------|
| BL | 56 KB |
| SJ/FB | 60 KB w/MSV11-DD |
| XM | 4 MB (requires KT(V)11 MMU)* |

* RT-11 does not support the "UNIBUS Map" Option (i.e., KT24). Memory above 256K bytes may not be used for DMA buffers on UNIBUS Systems.

- KXT11-AA/AB FALCON/FALCON-PLUS Single Board Computer
- KDF11-A 11/23 CPU Board
- KDJ11-A 11/73 CPU Board
- KK11-A Cache Memory for PDP-11/34
- KW11-P or KVV11-A Programmable Real Time Clock
- KEF-11 or FPF11 Floating Point Processor
- MXV11-A/B Multi-Function Memory Board

I/O Peripherals

- One CM11 card reader
- One LA50, LAV11, LPV11, LP11, LP25, LP26, or LS11 line printer
- One VT11A/VS60 Graphics Display Processor

Magnetic Tape Devices

- Up to four TSV05 (1600 BPI) Magnetic Tape Drives Each TSV05 requires a separate transport with controller (M7196) (64K bytes of memory required for streaming at 100ips)
- Up to four TU80 (1600 BPI) Magnetic Tape Drives Each TU80 requires a separate transport with controller (M7454) (64K bytes of memory for streaming at 100 ips)
- Up to four TU16/TE16 and/or TU45 magnetic tape drives (32K bytes of memory required)
- Up to four TU10/TE10 and/or TS03 magnetic tape drives (32K bytes of memory required)
- Up to four TS11 (1600 BPI) magnetic tape drives (32K bytes of memory required)
- Up to two TU58 DECTape II dual cartridge tape systems (total of four units) interfaced via DL11, DLV11, or MXV11-A/B.

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- Up to two TK25 dual cartridge streaming tape systems (total of 4 units). 64K bytes of memory required for streaming operation.

Disk Devices

Supported devices with handlers provided:

- One or two UDA50 Unibus Disk Adapters with up to two RA80 121MB disk drives (total of two drives).
- One RQDX1 controller with one or two RD51 fixed Winchester disk units and 1 RX505 ¼" dual diskette drive unit. (MICRO/PDP-11)
- One RK11 or RKV11 disk cartridge controller with up to eight RK05J or RK05F disk drives (each RK05F counts as two drives)
- One RK611 or RK711 disk cartridge controller with up to eight RK06 and/or RK07 drives (32K bytes of memory required)
- One RL11 or RLV11 disk cartridge controller with up to four RL01 and/or RL02 disk drives (more than two drives requires system generation)
- Up to two RX11 or RXV11 floppy disk systems with dual RX01 diskette drives (total of four units)
- Up to two RX211 or RXV21 floppy disk systems with dual RX02 diskette drives (total of four units)

Unsupported Devices With Handlers Included

- RA60, RA81, RP02/3, RS04, TU56, TU60, CR11, RK01, RK02, RK03, PC11, PDT 11/130.

Terminals

LA12, LA34, LA38, LA100, LA120, VT100, VT101, VT102, VT105, VT125, and VT131, VT2xx (7-bit mode only) terminals.

The maximum supported input data rate for any given terminal is 300 baud.

The maximum supported aggregate total input data rate for a system is 4800 baud. Higher rates are normally possible, depending on the processor type and system loading.

The output baud rate can be set to any speed. RT-11 sends output as fast as possible, depending on the capacity of the CPU and the nature of its load.

One hard-copy device connected to a DL(V) interface for use as a serial line printer.

*Terminal Interfaces **

- Up to eight lines
DL11-A, B, C, D, E, W
DLV11-E, F
DLV11-J (counts as four lines)
MXV11-AA, AC, BF (counts as two lines)
- Up to sixteen lines (up to eight lines on LSI-11, PDP-11/03)
DZ11-A, B, C, D, E, F
DZV11

- Not more than 17 lines total, including console

*Communication Interfaces **

- DL11 or DLV11-E single-line interfaces
- Up to two DZ11 asynchronous 8-line multiplexer (32K bytes required)

* NOTE: RT-11 does not support leased lines.

PREREQUISITE SOFTWARE

None

OPTIONAL SOFTWARE

Refer to the RT-11 Optional Software Cross Reference Table (SPD 20.96.xx).

For information pertaining to RT-11 running on the Professional 300 Series, please refer to SPD 40.31.xx.

SOFTWARE WARRANTY

Warranty for this software product is provided by DIGITAL with the purchase of a license for the product. There is no additional charge. This software product is warranted to conform to the Software Product Description (SPD). This means that DIGITAL will remedy any nonconformance when it is reported to DIGITAL by the customer during the warranty period.

The warranty period is ninety (90) days. It begins when the software is installed or thirty (30) days after delivery to the end user, whichever occurs first and expires ninety (90) days later. All warranty related support for this software will end 180 days after release of this subsequent version.

Warranty is provided in the country of purchase. DIGITAL will provide a service location which will accept reporting (in a format prescribed by DIGITAL) of a nonconformance problem caused when using the licensed software under normal conditions as defined by the SPD. DIGITAL will remedy a nonconformance problem in the current unaltered release of the licensed software by issuing correction information such as: correction documentation, corrected code, or notice of availability of corrected code; or a restriction or a bypass. The customer will be responsible for the preparation and submission of the problem report to the service location.

Warranty Exclusion

DIGITAL DOES NOT WARRANT THAT THE SOFTWARE LICENSED TO CUSTOMER SHALL BE ERROR FREE, THAT THE SOFTWARE SHALL OPERATE WITH ANY HARDWARE AND SOFTWARE OTHER THAN AS SPECIFIED IN THIS SPD, THAT THE SOFTWARE SHALL SATISFY CUSTOMER'S OWN SPECIFIC REQUIREMENTS, OR THAT COPIES OF THE SOFTWARE OTHER THAN THOSE PROVIDED OR AUTHORIZED BY DIGITAL SHALL CONFORM TO THE SPD.

DIGITAL MAKES NO WARRANTIES WITH RESPECT TO THE FITNESS AND OPERABILITY OF MODIFICATIONS NOT MADE BY DIGITAL.

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IF THE SOFTWARE FAILS TO FUNCTION FOR REASONS STATED ABOVE, THE CUSTOMER'S WARRANTY WILL BE INVALIDATED AND ALL SERVICE CALLS WILL BE BILLABLE AT THE PREVAILING PER CALL RATES.

INSTALLATION

This software product can be installed by the customer using the step-by-step documentation available for this product. Optionally you can purchase DIGITAL Installation Services which provide for the installation of the software product by an experienced DIGITAL Software Specialist.

DIGITAL's Installation Services can be purchased as part of a Packaged Service Option or bought separately.

ORDERING INFORMATION

Single-Use licensed software is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, which provide in part that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of DIGITAL's copyright notice and any proprietary notices on the software) for use on such CPU.

You will need a separate license for each CPU on which you will be using the software product (except as otherwise specified by DIGITAL). Then you will select the Materials and Service Options you need to utilize the product effectively. You can order these options individually. But, to ensure that you get the set of services you need and to simplify ordering, DIGITAL offers Startup Service Packages designed for your environment and experience level. **IF YOU ARE ALREADY FAMILIAR WITH THESE OPTIONS, YOU MAY OBTAIN THE ORDERING INFORMATION DIRECTLY FROM THE SOFTWARE OPTIONS CHART.** In most cases you will want to review the following descriptions to determine what options you require.

LICENSE OPTIONS

The Single-Use License is your right to use the software product on a single CPU and it includes your 90 warranty.

For your first installation of this software product you must purchase as a **minimum**:

- Single-Use License option, and
- Distribution and Documentation option

The license gives you the right to use the software on a single CPU and the Distribution and Documentation option provides the machine-readable software and related documentation.

To use this software product on additional CPUs, you must purchase for each CPU as a **minimum**:

- Single-Use License option

In addition to the right to use, the license gives you the one-time right to copy the software from your original CPU installation to the additional CPU. Therefore, the Distribution and Documentation option is not required, but optional.

PDP-11 Operating System General License Option

The PDP-11 Operating System General License Option is a package of single-use licenses which are your right-to-use all of the following operating systems on a single CPU:

Micro/RSTS, Micro/RXS, RT-11, RSX-11M, RSX-11S, RSX-11M-PLUS, DSM-11, RSTS/E, CTS 300

The General License option provides all the Single-Use License rights described above for each software product except it includes a 90 day warranty only for the first software product to be installed.

You purchase a General License option according to the category to which your CPU belongs. The categories are listed below.

| | |
|----------|---|
| QJB36-UZ | DCT11 Microprocessor Chip |
| QJB39-UZ | DCF11 Microprocessor Chip |
| QJB43-UZ | DCJ11 Microprocessor Chip |
| QJB46-UZ | KD11, KDF11 CPU Modules |
| QJB51-UZ | 11C23 MICRO/PDP-11 Models and Systems |
| QJB56-UZ | 11/03 through 11/23-Plus Models and Systems |
| QJB66-UZ | 11/24 through 11/40 Models and Systems |
| QJB76-UZ | 11/44 through 11/70 Models and Systems |

For the first installation of this software product you must as a **minimum**:

- have, or purchase a General License option, and
- Distribution and Documentation option

To use this software product on additional CPUs, you must as a **minimum**:

- have, or purchase a General License option for each CPU

Single-Use License Option For RT²

If you have RT-11 installed on a CPU fully licensed for that product and you wish to use the RT² portion of it on an additional CPU, you can purchase a Single-Use License for RT². This license gives you the right to use only the RT² portion and does not include software warranty.

MATERIALS AND SERVICE OPTIONS

Startup Service Packages

To meet the first year software support needs of your new computer system, DIGITAL offers comprehensive Startup Service Packages. For a fixed price, each Package includes the distribution media, documenta-

tion and one year of software service for this product and all concurrently purchased qualified DIGITAL dependent products. Additional service components, such as: installation, orientation and training, are included at various Package levels.

For more information on what is included in each Start-up Service Package level, please obtain the appropriate Service Description from your local DIGITAL Office.

Distribution and Documentation Option

The Distribution and Documentation option provides the machine readable software in binary form and the basic documentation. You must have, or order, a Single-Use License to obtain this option. You will need this option to install the software for the first time. When revised versions of this software product become available, they may also be obtained by purchasing this option again.

If you prefer to receive automatic distribution of revised versions for this product, you must purchase a Software Product Service Agreement.

Software Revision Right-To-Copy Option

The Right-To-Copy option allows a customer with multiple CPUs to copy a revised version of a software product from one CPU to another. Each CPU must be licensed for that product. You first install the revised software on one CPU; then you can make copies for additional CPUs by purchasing the Right-To-Copy option for each additional CPU.

If you prefer to automatically obtain the right-to-copy, you must purchase a Service Right-to-Copy for each additional CPU; this is a service added to a Software Product Service Agreement.

Documentation-Only Option

You can obtain one copy of the basic documentation by purchasing the Documentation-Only option.

Installation Service Option

DIGITAL's Installation Service is provided by a DIGITAL Software Specialist and accelerates your productive use of this product. For more information on what is included in this service, please obtain the appropriate Service Description from your local DIGITAL office.

Software Product Service Agreements

DIGITAL offers licensed customers annual Software Product Service Agreements to maintain their software:

DECsupport Service is the most comprehensive level of service offering critical problem on-site assistance and scheduled preventative maintenance. You receive telephone support that gives you timely answers and solves most software problems. In addition, you get revised versions of the software and documentation, and system newsletters or dispatches.

BASIC Service is ideal for customers who have a staff who's experience and expertise enables them to analyze and communicate a software problem to DIGITAL remote support centers. You receive telephone support that gives you timely answers and solves most software problems. In addition, you get revised versions of the software and documentation, and system newsletters or dispatches.

Self-Maintenance Service is designed for customers who require revised versions of the software and documentation from DIGITAL. In addition, you get system newsletters or dispatches and may submit software performance questions.

A variety of service options may be added to an existing Software Product Service Agreement, such as service for multiple-like systems. Contact your DIGITAL representative for additional information and ordering details.

For more information on what is included in these agreements, please obtain the appropriate Service Description from your local DIGITAL office.

Training From Education Services

To ensure customer success with DIGITAL products, Educational Services sells training for the installation, maintenance and/or management of DIGITAL software. Course formats vary from seminars to packaged training materials that include self-paced instruction and computer-based instruction to traditional lecture/labs at DIGITAL's worldwide Training Centers.

For a complete listing of course schedules and prices, refer to the *DIGEST*, Educational Services' quarterly publication. For curriculum-specific information, training recommendations and assistance in planning training programs, please contact your Educational Services Representative.

Professional Software Services

DIGITAL Software Specialists are available on a per-call or resident contract basis to help in all phases of software development or implementation. Specialists are available to serve as technical consultants, decision support consultants or business systems analysts. Resources are available to:

- Supplement your programming staff
- Assume project management responsibility
- Develop software
- Augment a system start-up service package with tailored services to meet specific needs

Contact your DIGITAL representative for additional information and ordering details.

SOURCE MATERIALS OPTIONS

You can obtain optional source materials for this software product by signing DIGITAL's Software Program Sources License Agreement and then purchasing the

source option(s) you want. The agreement entitles you to use the source materials at one customer facility or location which is specified in the agreement.

Most users do not require source materials. They are used primarily to make modifications to the software product. Source kits provided by DIGITAL do not necessarily contain all source files used by DIGITAL to build binary kits.

The following RT-11 programs are not included on the source kits: CREF, KED, MACRO, TECO, and TRANSF.

Source License and Sources Distribution Option

This option provides you with the machine readable source code for this software product. It gives you the

right to use the source code on any CPU at the facility/location specified in the agreement which has a Single-Use License for the object code.

Source License and Sources Listings Option

This option provides you with listings of the source programs for this software product. It gives you the right to use the listings for any CPU at the facility/location specified in the agreement which has a Single-Use License for the object code.

Sources Distribution Option

This option provides you with the revised version of the machine readable source code for this software product and requires the current version of RT-11 binary distribution for source assembly.

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Chart

The distribution Media Codes used in the Software Options Chart are described below. You specify the desired Media Code at the end of the Order Number, e.g., QJ013-H3= binaries on RX50 Floppy Diskette.

| | |
|------------------------------------|------------------------------------|
| 3 = RX50 Floppy Diskette** | R = Microfiche |
| D = 9-track 800 BPI Magtape (NRZI) | X = RX02 Double Density Diskette** |
| E = RK05 Disk Cartridge | Y = RX01 Floppy Diskette |
| H = RL02 Disk Cartridge** | Z = No hardware dependency |
| Q = RL01 Disk Cartridge | |

** Automated Installation Media

SOFTWARE OPTIONS CHART

NOTE: The availability of these software product options and services may vary by country. Customers should contact their local DIGITAL office for information on availability.

| OPTIONS | ORDER NUMBER |
|---|--|
| LICENSE OPTIONS: A LICENSE IS REQUIRED FOR EACH CPU. | |
| Single-Use License | QJ013-UZ |
| PDP-11 Operating System General License* | QJBxx-UZ |
| Single-Use License for RT ² (Quantity = 10) | QJV13-DZ |
| MATERIALS AND SERVICE OPTIONS: | |
| Package Service Options: | |
| Start-Up Service Package, Level III | QJ013-B3 QJ013-BD QJ013-BE QJ013-BH QJ013-BQ QJ013-BX QJ013-BY |
| Start-Up Service Package, Level II | QJ013-73 QJ013-7D QJ013-7E QJ013-7H QJ013-7Q QJ013-7X QJ013-7Y |
| Start-Up Service Package, Level I | QJ013-53 QJ013-5D QJ013-5E QJ013-5H QJ013-5Q QJ013-5X QJ013-5Y |
| Distribution and Documentation Option | QJ013-H3 QJ013-HD QJ013-HE QJ013-HH QJ013-HQ QJ013-HX QJ013-HY |

SOFTWARE OPTIONS CHART (continued)

| OPTIONS | ORDER NUMBER |
|---|--|
| Software Revision Right-To-Copy Option | QJ013-HZ |
| Documentation Only Option | QJ013-GZ |
| Installation Service Option | QJ013-I3 QJ013-ID QJ013-IE QJ013-IH QJ013-IQ QJ013-IX QJ013-IY |
| SOFTWARE PRODUCT SERVICE AGREEMENTS: | |
| DECsupport Service | QJ013-93 QJ013-9D QJ013-9E QJ013-9H QJ013-9Q QJ013-9X QJ013-9Y |
| Basic Service | QJ013-83 QJ013-8D QJ013-8E QJ013-8H QJ013-8Q QJ013-8X QJ013-8Y |
| Self-Maintenance Service | QJ013-33 QJ013-3D QJ013-3E QJ013-3H QJ013-3Q QJ013-3X QJ013-3Y |
| SOURCE MATERIALS OPTIONS: | |
| Source License and Sources Distribution | QJ013-ED QJ013-EE QJ013-EH QJ013-EQ |
| Source License and Sources Listings | QJ013-FR |
| Sources Distribution | QJ013-ND QJ013-NE QJ013-NH QJ013-NQ |

*For the complete Option Number, refer to the Ordering Information description for this option.

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